THE
VETERINARY JOURNAL

Editor :
FREDERICK HOBDAY, C.M.G., F.R.C.V.S., F.R.S.E.,
HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING,
OFFICIER DU MÉRITE AGRICOLE (FRANCE),
CAVALIERE DEI SS. MAURIZIO E LASSARO (ITALY),
HONORARY MEMBER OF THE AMERICAN VETERINARY ASSOCIATION,
PRINCIPAL OF THE ROYAL VETERINARY COLLEGE, LONDON.

Sub-Editor :
GLADSTONE MAYALL, M.R.C.V.S.

MARCH, 1928.

Editorial

THE "ACADÉMIE VÉTÉRINAIRE" OF FRANCE.

FOLLOWING the lead of the Académie de Médecine and the Académie d'Agriculture of France, the Société Centrale de Médecine Vétérinaire has successfully applied to the French Government for recognition as an Academy. On January 12th, 1928, the Académie Vétérinaire de France was constituted, with Professor Leclainche as its first President, and Veterinary-Inspector Fray as its first Vice-President.

The Academy is modelled on the Académie de Médecine, and will eventually consist of a President, Vice-President, a Secretary to the Council and a Secretary for the meetings of the Academy, a Treasurer, and a Curator, forming the Council, and a limited number of members of different categories. The present members of the Société Centrale de Médecine Vétérinaire will retain their position in the new body, but since their number is to be greatly curtailed (e.g. honorary membership is to be abolished altogether), a transitional period is foreseen during which two vacancies will be filled by only one new member. Election will take place under rules similar to those holding in analagous bodies, and will be ratified by the President of the Republic on the proposal of the Minister of Agriculture, nominal head of the Academy.

Among other changes involved is the renaming of the *Bulletin de la Société Générale de Médecine Vétérinaire*, which becomes the *Bulletin de l'Académie Vétérinaire de France*. It will be edited by the two Secretaries of the Academy, but it will be published as before, alternately with the *Recueil de Médecine Vétérinaire*, by the teaching staff of the Alfort Veterinary School.

The British Veterinary profession is represented in the Academy by Sir John M'Fadyean and Sir Arnold Theiler, as foreign associate members, with Major-General Sir John Moore, Mr. J. Dollar and Principal Frederick Hobday, as foreign corresponding members.

ANOTHER PLEA FOR HELP FOR VETERINARY EDUCATION.

THAT Great Britain is not alone in its endeavour to secure financia and other help for Veterinary education is shown by a well-written article which appears as the first of our General Articles from the pen of an Indian colleague, who draws attention to the need for advancement in this branch of science in his country. Curiously enough, he has termed it by the same name which has been applied to it on numerous occasions by various writers in this country, i.e. the Cinderella of the Government Departments. Unfortunately this name is too truly applied, and it is time that we woke up to the fact that we are as essential to the well-being of the country as human medicine, law, engineering, divinity, and any other branch which is considered an essential to the formation of a complete University. Abroad, our Continental neighbours have long recognised this, and the Veterinary School, instead of trying vainly to stand alone, has been linked up with the other learned sciences to become the Veterinary Faculty of a University. We cannot afford to ignore the advantages which accrue to such a combination, and the time is not far distant when every British Veterinary School will become the Veterinary Faculty likewise. The advantages for the student and graduate are too plainly obvious to need discussion.

General Articles

PLEA FOR BETTER VETERINARY EDUCATION IN INDIA.

By C. J. FERNANDEZ, G.B.V.C.,
Veterinary Surgeon Baroda State Army Service.

VETERINARY education has been the Cinderella of Government educational departments in India. After forty years of existence, it is still in its infancy and its growth and progress has been retarded by a parsimonious policy. It originated as a half-hearted attempt at imitating the veterinary arrangements of civilised European countries but has remained in its original conception through lack of encouragement and neglect of the persons responsible for the progress of agricultural welfare in India. (1) It is gratifying, however, to find that sentiment is undergoing a rapid and radical change, and that people as well as the Government are fast coming to a realisation and an appreciation of the value and importance of veterinary profession.

Value of Veterinary Science.

And, indeed, much elaboration is not needed to prove the immense benefits that accrue to a country through veterinary science. The veterinarian does not merely relieve the sufferings and prolong the existence of our dumb servitors, but he helps materially to conserve the vast wealth of the nation, invested in its flocks and herds. Moreover, the benefit to the general public by the State control through its veterinarians, of the chief infectious diseases of animals, some of them communicable to man, cannot be overestimated. Incalculable also is the value of animal life saved by prevention of the spread of contagious diseases by segregation, etc. Reports from towns and cities, where meat and milk inspection are carried out, show what service is rendered by the veterinarian in safeguarding the health of the population. Veterinary research has also proved of great benefit to its sister science medicine and the help rendered to medicine by experiments conducted on animals by both medical men and veterinarians is too well known to need more than passing mention. It is interesting, however, to point out that Ehrlich discovered his famous " 606 " remedy for human syphilis whilst studying the action of arsenical preparations on the pathogenic spirachaetes of fowls. Again, it was by the study of fowl cholera that Pasteur demonstrated that the virus could be so attenuated by artificial culture as to act as a vaccine against a virulent or fatal form of the natural disease.

Its Importance in India.

India is an enormous country, chiefly agricultural. Agriculture in the main may be said to mean the art of raising plants and animals that are best suited for the supply of food for man. If this is so, then the importance to India of maintaining the health of the live-stock in the country, which is chiefly in the hands of veterinarians, may be appreciated when we consider that the total livestock in 1924-25 in India was 213 millions. (2)

It is interesting to recall here the reasons which led the Government of Bombay to establish the Bombay Veterinary College. In their resolution the Bombay Government then stated: "It is difficult to overrate the importance of agriculture and agricultural stock in India; and seeing that the value of agricultural cattle, which perish from plague and other epidemic diseases in India is calculated at £6,000,000 sterling per annum (1883), it is obvious that any measure which would tend to check this great mortality and heavy loss by increasing the knowledge of the nature and remedies for the various diseases, which attack cattle, and provide a class of persons competent to treat scientifically the different maladies, to which cattle are subject, would prove of immense advantage to the State and to the innumerable owners of livestock, comprising the mass of the cultivators." (3) These reasons as set forth by the Bombay Government have increased yearly in importance and weight.

In his presidential address to the third All-India Veterinary Conference, Principal MacGregor of the Bengal Veterinary College, stated: "Without looking even into approximate figures, a casual glance at existing facts, such as that of the number of veterinarians in India, relative to area and cattle they tend, may suffice to prove the colossal task we have in front of us. It works out at one veterinarian to 1½ lakhs of cattle in every 700 square miles, whereas in the United Kingdom, the figures approximate one veterinary surgeon to 5,241 cattle in every 51½ square miles." This gives a faint idea of the enormous field for expansion and development of veterinary science and education in India. The present staff of the Veterinary Service is therefore totally inadequate to cope successfully with the problems presented in any one branch of the work, either in research, teaching or executive.

Veterinary Colleges.

With the exception of a few men, who come out from England, the present staff is chiefly recruited from the four veterinary Colleges in Bombay, Bengal, Madras and Lahore. The course in each of these Colleges except the Punjab College covers a period of three years.

The oldest of all is the Bombay College, which was opened just 40 years back under the direction of Mr. Steel. Principal Steel undertook his new duties with enthusiasm, but his career was cut short by his untimely death, which was a serious blow to the promotion of Veterinary Science in India. In his annual reports during the four years he conducted the College, Principal Steel outlined his ideas for the future development of the College. He reported that " the average amount of knowledge conveyed to our students before they become practitioners will equal that given in the British School." . . . " Our best men will not equal the best European graduates, but they will not fall far short and the discrepancy will disappear with time and the still further development of the College." (4) The College, therefore, opened under very happy auspices, and it was confidently expected that in a few years it would be affiliated to the Bombay University. Indeed, Principal Steel in his comprehensive reports dealt with this aspect of the question. Referring to the minimum limit of general education fixed for applicants for admission, he said : " If in future, as I consider *very desirable*, our College be affiliated with the University of Bombay, the time will have arrived when admission may be refused to non-matriculates." (5)

Failure of Principal Steel's Hopes.

All these high hopes, however, of Principal Steel, have not been at all realised. " The curriculum of studies has been from time to time so reduced that it has now been brought to an extremely elementary degree, incompatible with the name and aims of the College and seriously telling upon the efficiency of its present alumni, who in proficiency cannot be compared with those of the past." (6) These remarks, made by Professor Narsingrao in 1904, need to be qualified in the light of later developments. It may be generally stated, however, that the course of instruction at present given in the three Veterinary Colleges in Bombay, Calcutta and Madras, is entirely inadequate to produce a properly qualified graduate. It will be apposite here to quote the criticism of the training imparted in the Bengal College by the Veterinary Journal (April, 1926). " This method," says the Journal, " of production of veterinary staff may have been necessary in the early days of the profession's existence in India ; but at the present day, to turn a man out of College, ill-equipped in the struggle for existence, is a crime of which the veterinary profession should not be guilty. That this is going on in the Bengal College is evidenced by the unemployed graduates and the shortage of applicants to vacancies for students at the College. . . . Unless the Bengal Government moves with the times by employing a full

expert teaching staff and extending the course to give the students a fair opportunity of gaining a thorough knowledge of their profession the College may close its doors, as no sane person would send his son to spend three years at College, gaining a smattering of learning, which is useless as a means of livelihood afterwards."

Need of Revision of Curricula.

That the curricula in the Colleges needed a thorough revision was, however, recognised by the Government of India themselves and early in 1922, under instructions from the Agricultural Adviser to the Government of India, a meeting of the Principals of Veterinary Colleges met at Bombay. The meeting recommended that the course be extended in all Veterinary Colleges to four years in English, and that a higher standard of preliminary education be demanded of recruits. It was further of the opinion that the standard of the matriculation examination of the local university concerned be insisted upon prior to entrance to the Veterinary Colleges. The meeting considered that the scheme of study and method of examination outlined by them was of a sufficiently comprehensive and advanced character to justify recognition by the local universities as an approved degree course in science and the conference by these bodies of a special degree in science entitled B.Sc. (Vet.) on students who graduate in this course. (7)

This system of study was discussed and approved by the Second Meeting of Veterinary Officers in India held at Calcutta in 1923. In the course of the discussion that took place at the meeting some very pertinent remarks were made by the veterinary officers. A few extracts from the proceedings published under the authority of the Government of India will not be out of place :—

Approval of New Scheme.

The President, Colonel G. K. Walker, C.I.E., O.B.E., F.R.C.V.S., Principal of the Punjab Veterinary College, Lahore, stated :—

" The discussion on this knotty point has revealed the fact that we are practically unanimous in approving whole-heartedly the course of instruction prepared by the Principals at Bombay. I shall ask a formal resolution to that effect. There is no doubt that it represents a genuine attempt to educate Indians up to the highest standard in veterinary science. Personally, my only fear is that four years may prove to be rather too short a time for students admitted to colleges after passing the matriculation standard of examination to grasp the work. My experience in the Punjab is that the matriculation standard is not very satisfactory. We should aim at obtaining students

with the intermediate qualifications in science and the Punjab prospectus provides for them."

Again: "The scope of veterinary study has developed so much that three years' study for men of inferior preliminary education is quite insufficient. Why then pretend to give a qualification that cannot be substantiated in its practical outcome?" and more to the same effect. He favoured the admission of students who had passed the University intermediate examination in Chemistry and Biology as soon as possible. The matriculation standard in science was not sufficient.

Mr. J. T. Edwards, B.Sc., M.R.C.V.S., Director, Imperial Bacteriological Laboratory, Muktesar: "He strongly maintained that the Bombay programme represented the minimum required for the inculcation of an intelligent conception of veterinary science as the science stood at the present day. He pointed to the advances made in our knowledge during recent years, since the time when shorter courses of study were adequate."

Legal Status.

It is not necessary to dwell further on the necessity of revising and improving the present courses of study in the colleges in India. The present training has produced, it is true, some men, who have filled with distinction the highest posts in the Indian Veterinary Service, but the general type is not of that quality, that can be compared with veterinarians in England or other countries. As Colonel Walker said at the meeting of veterinary officers, referred to above, "We owe it to our profession to insist that a man, who describes himself as a veterinarian should be well educated and capable of meeting members of other scientific professions on equal terms. The time will come in India, as in other countries, when a legal status will be given to qualified veterinarians. If we look ahead, therefore, we should, in order to avoid complication create a well-educated class entitled to the use of the term "Veterinarian." These words of Colonel Walker indicate the way in which the solution lies. The low status of the veterinarian, passed out from Indian colleges, has lowered the reputation of the profession itself in India. This bad impression has been strengthened by the inferior quality of the man turned out with the result that both the Government and the public have attached little importance to the benefits to the country to be derived from veterinary work. Having clearly before one's mind the innumerable benefits that will accrue to the country from that work, it will be apparent how urgent is the necessity of reorganising veterinary education and service in India. College education in veterinary science

needs to be improved at least to the extent proposed by the meeting of Principals. It will produce a higher type of graduate, and it will attract better men to the profession, which has wrongly and to the great harm of the country, been relegated to a low and insignificant position. The better man will naturally demand higher pay and better prospects in Government service. But this need not deter Government, as it has done in the past, since in the long run it will be more economical considering the better service of the new men. If necessary Government can certainly side by side institute a lower grade of service for men with inferior training to perform certain duties mechanically.

Education in Foreign Countries.

The Government of India will do well to take a leaf from the example set by the most progressive countries in the world. In America, on the Continent and in England, the importance of veterinary science is being increasingly recognised. Foreign universities have instituted special chairs and courses of studies and confer degrees in the science, which occupies a place of equal status and importance to medicine. Government posts, carrying good pay, have been created all over the country and legislation dealing with cattle, etc., and giving certain powers to the veterinarian in cases of infectious diseases have been passed. Such encouragement has reacted for the good of the science itself, attracting better men and developing research work, to the great benefit of the country.

Thus in Germany since 1902, veterinary surgeons have had to go through an equal preliminary education for university study to that of medical men, and the period of technical study has now been extended to four years. The examination in natural science, as well as in the special branch of veterinary science, has to be passed, and the former has to be surmounted before the student can enter for the veterinary examination, the veterinary schools having thus attained the organisation and extensiveness of universities. The Dresden Veterinary School was incorporated in the University of Leipzig and the Munich School with the University of Munich in 1911, the degree of Dr. Med. Vet. being conferred by them. (8)

The number of Veterinary Colleges in the United States is legion. A strong organisation, the American Veterinary Medical Association with a large membership, looks after the interests of veterinary science. Almost all the great Universities, such as Pennsylvania, Cornell, etc., have their veterinary departments or schools, and a great many State Universities are similarly equipped. Besides these there are several institutions of a more private character that stand high as teaching colleges.

XUM

Even in a small country like Switzerland, there are two University faculties, one in Zurich, the other in Berne. Students in these faculties are required to matriculate according to the revised regulations of the year 1910. By thus raising the standard of elementary education, the two veterinary colleges were enabled to keep pace in their development with the other natural sciences and the faculty of Medicine. The fear expressed in former years that the requirements of matriculation and the creation of a medical veterinary faculty would limit the number of veterinary surgeons has not been realised. On the contrary, there are now a much greater number of veterinary students than before. (9) In other Continental countries also, veterinary education is highly developed. In Hungary, veterinarians are entitled to the degree of " Dr." In Belgium the course of studies lasts for seven years. In Italy, there are seven State veterinary schools, which are centres of research and also of teaching, the instruction given being of the very best. (10)

Highly Developed in France.

But perhaps in no other country in Europe, veterinary education is so highly developed and systematised as in France. " Veterinary education in France is national. There are three national Veterinary Colleges—Alfort, founded in 1765 ; Lyons, founded in 1761 ; and Toulouse, founded in 1825. Aspirants for admission apply to the Minister of Agriculture and submit with the application their legal, moral and educational credentials. Applicant must hold the " Baccalaureat " of the French educational system. The competitive examination is both written and oral, and is a test of the applicant's knowledge of composition, physics, chemistry and biology, including zoology, botany and paleontology. The college course is four years of 10 months each, exclusive of examinations. Each professor is a master of the subject he teaches, an authority of world-wide reputation. He is so well-known to readers of books and current literature that one feels acquainted with him before the introduction. The school is divided into 10 departments called chairs, each one directed by a professor, who is supplied with an assistant professor and tutors as required. Each chair has its own buildings and equipment, including laboratories, and such laboratory paraphernalia as the group of branches it covers requires. (11)

Lessons for India.

From a cursory glance at the educational systems of foreign countries, two facts are apparent. One is the high standard of education demanded of the candidate on entrance, and the other is the advanced technical teaching. The high standard of entrance examina-

XUM

tion is essential so that the candidate might profit from the teaching in the veterinary college, and it is thus complementary to the advanced course of technical training provided for the student. Sufficient importance is not given to this entrance qualification in India, with the result that the Indian graduate lacking in general education fails to make efficient use of the facilities actually provided for him even at present. He has little enthusiasm for his profession and fails to realise the noble opportunities for service before him. His work is characterised with listlessness, and he easily falls, especially when in Government service, into a mechanical routine. "A process of settling down into grooves takes place. It gives licence to a stagnant serenity of mind and hopeless placidity, which no other form of employment can, and in the tropics, where a driving and dominating desire to progress, to improve is more essential to the individual than in more temperate climes, we find this form of employment in greater prominence" (Principal MacGregor). This "hopeless placidity" to which Principal MacGregor refers is to a very great extent due to the want of general education in the Indian veterinarian.

Veterinary Science and Medicine.

The need of a high standard of preliminary education is confirmed by the findings of Lord Haldane's Royal Commission on University Education, which states "that the modern veterinary surgeon should proceed through an exacting programme of education, a course of training as specialised and as thorough as that of the student of human medicine."

The need of immediate revision of the present courses of instruction in Indian Colleges has been acknowledged by the highest authorities in India. The four years' course proposed by the Principals' meeting may certainly be adopted with advantage. It embodies the experience gained in India by years of actual teaching practice. It also recognises the necessity of better study of bacteriology and pathology, and cognate subjects than at present, thus endorsing another finding of Lord Haldane's Royal Commission, which found that the "future development of veterinary medicine depended upon its adoption of the methods of dealing with disease that have been worked out for human pathology," thus prescribing a training for the veterinary student equal to that for the medical student.

The Commission considered that research in animal disease must of necessity, be associated with research in human disease, and that a department dealing with animal disease has become almost as necessary to a school of investigation in human medicine as the association with human pathology is to investigation in animal disease. This pro-

XUM

nouncement by no less an authoritative body than a Royal Commission should be carefully considered both by Government as well as Indian Universities. It shows the importance and value of veterinary science in research work. In fairness to Indian Universities, it must be mentioned, however, that some of them are prepared to hold examinations and award degrees in veterinary science, if the standard of admission and training in colleges is raised.

In conclusion, it may be mentioned that Government has always relegated veterinary science and education to the background. The argument of economy and want of finance has been every time propped out, when any complaint has been made or any agitation started for improvement in the scale of pay of veterinary officers or for better staffed colleges. It is time that the Government should reconsider its suicidal policy in the case of such a nation-building department. The appointment of the Royal Commission on Agriculture is, however, a landmark in the history of veterinary science in India, and has aroused bright expectations. Let us hope that they will be realised.

The Conclusions.

From all these considerations, the following conclusions may be drawn :—

(1) The curriculum adopted by the meeting of Principals in Bombay in 1922 should be introduced in the four Colleges without delay.

(2) As College education is raised, efforts should be made to affiliate them to the respective Provincial Universities.

(3) Post-graduate courses should be instituted in all the Colleges, and better facilities for research made available.

(4) The prospects of the veterinarians in the lower Government service should be raised, in sympathy with his better education and higher status as a University graduate to the same standard as that of the medical and agricultural graduate.

HAFFKINE'S ANTI-PLAGUE VACCINE AS A PROPHYLACTIC AGAINST PLAGUE, AMONGST PRIMATES.

By D. S. LAUD, G.B.V.S.,

Veterinary Surgeon to, and Superintendent of, Victoria Gardens, Bombay.

VERY few veterinary surgeons, except those in charge of a menagerie or zoological gardens, have the opportunity of treating

primates (viz. monkeys) in their veterinary practices. Being one of those who are fortunate, I take leave to record a few clinical cases of plague amongst them, which occurred in the Victoria Gardens, and the prophylactic measures adopted with a view to prevention. I trust these notes will be interesting to veterinarians and the profession.

But before proceeding to note my clinical notes of plague in baboons (hamadryas or dog-faced monkeys), it would not be out of place to mention what plague is, how it is spread, its causes, etc.

Plague is a specific, inoculable, or otherwise communicable, epidemic disease, common to man and many of the lower animals. The symptoms of this disease are fever, adenitis, crisis, and a very high percentage of mortality. A specific bacterium *Bacillus pestis* is found in the lymphatic glands, viscera, and blood. In the majority of cases the disease appears in bubonic form (commonly known as bubonic plague, viz. buboes form in the glands of the groins, axillæ, or neck). It is primarily a disease of rats and its communication to man and the lower animals may be said to be accidental. Under favourable circumstances it is communicable to man from rats by means of rat fleas, and therefore the association of human beings with rats depends on the mode of living of the former and on the habits of the latter. If rats could be exterminated there would be no plague. If this is considered impossible, then we have two alternatives to choose from: (1) either the dwelling-house should be evacuated, or (2) to obtain protection against the disease by inoculation of a prophylactic vaccine.

The rat flea, *Pulex cheopis*, feeds on a number of animals. It acts as a passive carrier of the *Bacillus pestis*, the bacterium which causes plague. This bacillus multiplies in the stomach of the flea, retaining its virulence for seven or eight days, and is passed out in its fæces. Therefore, the rat flea not only acts as a carrier, but also supplies nidus for the multiplication of the bacilli. In the absence of rats, the flea will bite man; especially when it has been starving for two or three days; but when rats are available it will prefer to be on rats. This is the usual way in which infection is communicated, and the presence of an epidemic of plague in rats is usually followed by an epidemic of plague in men.

Out of the three baboons located in the baboon cage in the park, one got ill on May 7th, 1925. It was removed to the infirmary in our gardens for treatment. The only symptoms then observed were dullness, fever, off feed, with great weakness and prostration. The animal was prescribed medicine in the form of stimulants and diuretics. It died on May 9th, 1925. No autopsy was held.

On May 11th, 1925, about noon, another baboon from the same cage was taken ill and was removed to the infirmary.

Symptoms shown : Vomiting, off feed and high fever.

Prescribed :—

Bismuth Subnitras	5 grs.
Sodi Bicarb	10 ,,
Spirits Etheris Nitrosi	15 m.
Tincture Cardam Co.	20 m.
Aquae	1 oz.

M. ft. mist.

Give Pot. Nit. grs. 5 in drinking water.

The animal declined all food and milk.

On the morning of May 12th, 1925, vomiting stopped, but the animal was weak and lying down. It was given the usual stimulants with Jamaica rum, but died in the evening. The carcase was sent to the Haffkine Institute at Parel for microscopical examination, and the following report was received :—

" Plague bacilli seen in the smears of spleen, liver and heart blood."

The carcase was burnt in the incinerator at the laboratory. The third baboon from this cage in the park was removed to another cage, and the park cage together with the cage in the infirmary disinfected with the solution of hydrargyri perchlor (1 in 1,000) and further fumigated with sulphur candles.

On May 13th, 1925, this third baboon was taken suddenly ill about noon. It had taken only papai fruit (*Carica Papaya*) in the morning ; and was hale and hearty prior to this. On my rounds in the garden at 3 p.m. I found this animal to be in a prostrate condition. It was removed to the infirmary, where it died in the evening.

On May 30th, 1925, a baby Capbell monkey (*Cercopithecus Campbelli*) suddenly fell headlong from the top of its cage, located in the monkey house in the park, without any apparent signs of illness, and died the next morning. As the case was considered suspicious, the carcase was sent to the Parel Laboratory for the microscopical examination of its blood, etc., but it was reported to be free from plague.

From the above enumerated facts, it will be seen that the cases occurred in one cage, amongst the animals in actual contact, and within the course of one week. No rats were found dying in the garden so as to arouse suspicion, but it is possible that the source of infection was from a dead, infected rat, which might have escaped our notice and have been removed with the garden sweepings. However, as a pre-

cautionary measure it was decided that all the monkeys of the Victoria Garden should be inoculated with the Haffkine's plague prophylactic vaccine, which is prepared and can be had from the Haffkine Institute at Parel. The human adult dose is 4 c.c., but if the vaccine is fresh (i.e. used within three months of the date of preparation) it is 3 c.c. This was the first occasion the vaccine treatment was adopted and as no information could be had as to the dosage for monkeys great precaution was exercised and the doses given were from ½ c.c. to 1½ c.c., according to the size and age of the animals, subcutaneously. The monkeys were divided into three lots and each inoculated after an interval of about 10 days so as to watch the results. All of them stood the doses well.

Each monkey was first removed to a small transfer cage, where it could be well handled and secured, and after due aseptic precautions the dose was given subcutaneously on the inner side of the thigh.

The following are the details of doses used :—

Lot No. 1.—Infirmary Animals.

Particulars of Monkeys, etc.	Technical Name and Habitat.	No. of Animals	Dose for Each.	Remarks.
			c.c.	
Lemur (Young)	Lemur Mangoz (Madagascar)	1	½	
Pigtailed ..	Macacus Nemestrinus ..	1	1	
Malbrouck ..	Cercopithecus Cynocurus, West Africa	2	1	
Rhesus ..	Macacus Rhesus India ..	3	1	Fresh Vaccine Brew No. 1672. No. 27 of Mar. 12th, 1925.
Baboon (dog-faced). ..	Cynocephalus Hamdrias, Abyssinia ..	1	1	
Bonnet	Macacus Sinicus, India ..	4	1	
Campbell (from Monkey house)	Cercopitheinus Campbelli, West Coast of Africa ..	2	1	

Lot No. 2.—Monkey House.

Date of Inoculation, June 11th, 1925.

Particulars of Animals, etc.	Technical Name and Habitat.	No. of Animals	Dose for Each.	Remarks.
Bonnet (Young)	Macacus Rhesus, India ..	1	c.c. ½	Old Stock, Brew No.
Bonnet	Do.	7	1	9489. No.
Bengal Rhesus ..	Do.	2	1	5 of July 1st, 1920.

Lot No. 3.—Monkey House.

Date of Inoculation, June 22nd, 1925.

Particulars of Animals, etc.	Technical Name and Habitat.	No. of Animals	Dose for Each.	Remarks.
Cral Eating ..	Macacus Cynomulgus, Malay Peninsula ..	3	c.c. 1	
Malbrouck ..	Cercopithecus Cynosurus, West Africa	1	½	
Do.	Do.	1	1	
Pigtailed ..	Macacus Nemestinus, Malay Peninsula ..	3	1	Fresh Vaccine Brew No. 1672. No.
Do. (Aged) ..	Do.	1	1½	24 and No.
Campbell ..	Cercopithecus Campbelli, West Coast of Africa ..	1	1	25 of Mar. 12th, 1925.
Skyes	Cercopithecus Albigularis, East Africa ..	1	1	
Lemur	Lemur Mangoz, Madagascar ..	3	½	
Bonnet (new in the infirmary)	Macacus Sinicus, India ..	4	1	

With regard to the immunity, I wish to draw your attention to page 24 of the " Bombay Bacteriological Hand Book," issued by the Bombay Bacteriological Laboratory, wherein it is stated as follows :—

The amount of protection conferred on an individual by inoculation depends on :—

(*a*) The dose of vaccine used.

(*b*) The power the individual has of reacting to a certain dose of vaccine.

(*c*) The circumstances in which the individual is found at the time he is subjected to injection.

(*d*) The dose of the vaccine which he receives.

With such a number of varying factors affecting the degree of immunity conferred by inoculation, it is impossible to lay down the exact period during which the protection lasts. Some statistics are available, however, to show that while protection is most marked during the six months immediately following inoculation, immunity is still marked at the end of one year; and the degree of protection remaining during the second year after inoculation is only slightly less than the first year; also that even after five years some trace of protection remains. While this is so, it is very desirable that persons should be inoculated during each successive plague season so as to acquire as high a degree of protection as possible.

We may, however, safely take that the average period of immunity is from six to nine months.

In conclusion, I may state that these were the first cases of plague I had seen in monkeys and this was the first occasion on which I had used Haffkine's Plague Prophylactic Vaccine amongst primates.

Since these above observations, I am glad to note that Mr. Shukla, of the Maharajah Baugh Zoo has similarly used the anti-plague vaccine for plague in monkeys, and his observations have been recorded in the *Indian Veterinary Journal*, Vol. III, No. 13, of January, 1927.

TUBERCULOSIS ERADICATION IN THE UNITED STATES.*

An average of 211 regularly employed bureau veterinarians were engaged in the work under the supervision of the inspectors in charge of 44 field offices. The livestock sanitary officials of the respective states employed an average of 267 veterinarians, including a limited number employed by municipalities. In addition, approximately 290 regularly employed veterinary inspectors were engaged by the many counties under the intensive area plan. In all there were 768

* Abstracted from *Veterinary Medicine*, February, 1927.

veterinarians engaged in the work regularly throughout the year. As in previous years, the county veterinarians showed the most marked increase. The tuberculin test was applied to 774,728 herds, containing 8,659,780 cattle, of which 323,084 cattle, or 3·7 per cent. were condemned as diseased.

Figures reported by the field offices show that during the fiscal year 1926 accredited veterinarians under this plan tested 43,921 herds, containing more than 788,995 cattle, an increase over the preceding year.

In connection with the tuberculin testing, a survey was made to ascertain the number of towns and cities in the United States which had municipal ordinances requiring tuberculin testing of cattle furnishing milk for consumption in their communities. On May 1st, 1926, it was ascertained that there were 1,249 such cities (minus records from one state), and that all of these were, with the exception of approximately 1 per cent., being fairly well enforced. This is an indication of the interest of the Nation in securing milk or dairy products from healthy cattle.

Of the cattle reported tested during the year, about 22 per cent. were tested by bureau inspectors and about 78 per cent. by state, county, municipal and accredited practising veterinarians.

Fowl Tuberculosis.

The question of fowl tuberculosis continues to be an important phase of the tuberculosis-eradication problem. A survey begun in 1925 and continued during the fiscal year 1926 covered the inspection of approximately 157,950 poultry flocks, containing about 14,000,000 fowls, in 40 States. Approximately 10,000 of these flocks were found to be infected with tuberculosis.

Regulation of Inter-State Movement of Cattle.

Most of the tuberculin testing of cattle for inter-state movement was done by approved veterinary practitioners, of whom 8,908 are on the list approved by state and Federal officials. These men tested for inter-state shipment 29,924 herds, containing approximately 355,836 cattle, of which 0·7 per cent. reacted. This is an increase of about 76,000 over the number of cattle tested in the fiscal year 1925. Bureau inspectors tested at public stockyards 72,837 cattle, of which 1,513 or 2 per cent., reacted. Permits were issued for the inter-state movement of 82,067 known reactors for immediate slaughter.

Tuberculosis Yields to Eradication Methods.

The very active nation-wide campaign to eradicate tuberculosis from livestock continued with gratifying results. During the year

a large increase in county-wide testing of cattle occurred ; 109 counties completed tuberculin testing of their cattle with results that permitted the bureau to list them as modified accredited areas. The year's work brings the total of such counties to 198. The large area thus virtually freed of bovine tuberculosis is convincing evidence that the task of eradicating the disease from the entire country is possible of accomplishment. The number of accredited herds also increased greatly.

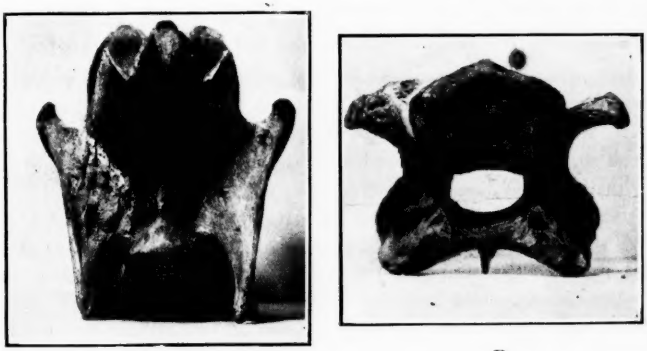
Clinical Articles

Equine Tuberculosis.

By MAJOR C. S. NORTHCOTT.
Royal Army Veterinary Corps.

SUBJECT.—A chestnut gelding, aged four years.

HISTORY.—This animal was foaled in April, 1923, and sold at a local market in September, 1923. The farmer who bought it, fed the



A B

A, B } Cervical Vertebræ with typical lesions.

C. Dorsal Vertebræ showing a tumour-like excrescence on the ventral surface of the bodies of the eighth and ninth dorsal vertebræ.

foal during its first year on cow's milk (the most probable source of infection). The animal was subsequently exhibited at local horse shows and won prizes as a two and three-year-old.

It became the property of the Army Remount Department in February, 1926, and after being trained at an Equitation School from July, 1926, to September, 1927, was returned to the Remount Depot, apparently in normal health and good condition. At this time, however, it was noted that the horse had a very straight back.

A month later the animal began to fall away in condition, appeared stiff in his back and loins, was sluggish, and tired easily at work. It was kept under observation.

SYMPTOMS AND DIAGNOSIS.—The clinical picture at first was somewhat obscure, merely showing some loss of condition, a stiffness of the back, an impaired appetite, a difficulty in micturition and appearing in a state of depression. Pulse and temperature were normal.

In the course of a month the loss of general condition of the patient became more pronounced and the disinclination to feed and take water was more apparent. By this time it was found to be unable to feed off the ground which, coupled with the difficulty in micturition, was due to lesions in the vertebral column. The gluteal muscles were soft and flabby. Constipation was pronounced, the fæces being small and hard. The animal often alternately lifted the hind limbs. Examination *per rectum* revealed nothing abnormal, but the bladder contained some urine. The pulse remained normal throughout, but the temperature commenced to fluctuate two months following the date when the horse came under observation.

A sample of urine was taken and submitted for examination at the Military Laboratory, the result of which showed the urine to be of a high specific gravity (1050), no albumen, but sugar present in fair quantity. A week later a further sample of urine was subjected to examination by way of confirmation of the rare occurrence of sugar in the urine of equines, and the result was that the presence of the substance Creatinine which gives a similar reaction to sugar with some reagents was negatived, and the presence of sugar in the form of dextrose as determined by Benedict's, Nylander's, and Bottger's tests was confirmed. The presence of sugar in the urine suggested Tuberculosis and the tuberculin test was applied by the subcutaneous method. The animal was destroyed because it got down and could not rise on the day following the application of the test.

POST-MORTEM.—The following lesions of Tuberculosis were discovered: (1) A large tumour of a tuberculosis nature about the size of a large coconut, situated in the base or dorsal extremity of the spleen.

(2) Osseous enlargements, with an osteoporosis, in the vertebral column involving all the cervical vertebræ except the 6th; and the

2nd, 4th, 5th, 6th, 8th, and 9th dorsal vertebræ, together with some of their costal attachments.

It is exceedingly interesting to note, however, that no lesions occurred in the mesenteric lymph glands, small intestines, or liver.

Diagnosis was based on clinical symptoms, sugar in the urine, and the tuberculin test; and was confirmed both by the appearance of lesions on *post-mortem*, and by the injection of material from lesions into a laboratory animal.

(I am grateful to Major A. A. Pryor, D.S.O., R.A.V.C., for his aid in diagnosis, and to Mr. J. Crisp for the photographs.)

Chart "A."

Day.	1.		2.		3.		4.		5.		6.	
	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.
Temperature	100·8	101	100·4	100·6	100	100·8	100·8	101	100·4	101	101	100·8
Pulse ...	36	36	38	40	40	40	44	48	46	48	48	48

Day.	7.		8.		9.		10.		11.	
	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.
Temperature	101	101	101	102·4	101	102·4	101	102·4	101	101·8
Pulse ...	48	46	48	52	60	52	48	48	46	48

Day.	12.		13.		14.		15.		16.	
	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.
Temperature	100·8	100·6	100	100·8	100·8	101	99·8	100	102	102
Pulse ...	48	48	48	48	44	46	48	48	52	52

Day.	17.		18.		19.		20.		21.	
	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.
Temperature	100·4	102·4	100·8	100	101	101·8	101·8	101·4	104·2	100·8
Pulse ...	52	52	52	48	52	48	48	64	64	—

XUM

Chart "B."

	20–12–27	20–12–27	20–12–27	20–12–27	20–12–27	21–12–27	21–12–27
Hour ...	0	3	6	9	12	15	18
Temperature ...	8.C.C.S. Tuberculin 100·8	100·4	104·4	103	103·2	102·4	101·8

	21–12–27	21–12–27	21–12–27	
Hour ...	21	24	27	
Temperature ...	102	100·6	100·6	Destroyed on account of Decubitus.

Two Cases of Chylous Pleurisy.*

By Dr. TASKIN.

CASES have been noticed from time to time in the dog, and often in the cat, of peritoneal discharges of lactescent or milky appearance, which have been named chylous or chyliform on account of their nature. A shoal of hypotheses have been put forward as to their etiological origin, but to say the least of it there remain a large number of unexplained cases. Milky discharges from the thoracic cavity are much rarer, and for this reason we have thought it of interest to report as briefly as possible the two following cases, one observed in a dog, the other in a cat.

Report No. 1.

The patient was a ten-year-old German sheep dog and was brought to hospital on June 10th, 1923, suffering from dyspnœa.

PREVIOUS HISTORY.—A month before, the dog had suffered from a deep sore on the left side of the chest a little within the point of the shoulder, the sore having extended to the apical dome of the pleura.

CLINICAL EXAMINATION.—When the examination was made the sore referred to was quite healed. There was slight hyperæmia. Percussion revealed marked dullness on both sides, limited to about

**Recueil de Médecine Vétérinaire*, Vol. ciii, No. 22, 30/12/27.

half way up the chest. Auscultation revealed thickness in breathing in the zone of dullness, louder murmur above, heart sounds deadened. Briefly, signs of pleurisy with effusion.

Thoracentesis gave three litres of a liquid strongly resembling milk, which on microscopical, chemical, and bacteriological, examination was found to contain numerous fatty globules; but which showed no sign, even after centrifuging, of Koch's bacillus, and very few leucocytes.

DIAGNOSED.—Chylous pleurisy, probably of traumatic origin.

TREATMENT.—Theobromine, digitalis, and calcium chloride. Thoracentesis repeated every week, and withdrawing on each occasion three litres of liquid of similar milky appearance.

The patient died on August 20th, 1923, during an attack of dyspnœa.

Report No. 2.

A six-year-old female cat was brought for treatment on September 5th, 1927, suffering from dyspnœa.

PREVIOUS HISTORY.—The cat had been mated two months previously; its abdomen had increased in volume and the dyspnœa had made its appearance, but the owner had supposed that these symptoms were due merely to gestation. Two years earlier the cat had had a deep wound on the abdomen, apparently without penetration of the peritoneum.

CLINICAL EXAMINATION.—Upon palpation of the abdomen the uterus was found to be empty, and there were suspicious signs of dropsy. Percussion of the thorax revealed rather exaggerated sounds. Auscultation revealed increased murmur. Four cubic centimetres of a milky liquid were drawn from the abdomen, which, examined microscopically, chemically and bacteriologically, showed signs of numerous fatty globules and a few leucocytes, but none of Koch's bacillus, even after centrifuging. Attempts to draw liquid from the pleura and pericardium gave negative results.

DIAGNOSIS (doubtful).—Disordered circulation; dry pleurisy at first.

TREATMENT.—Caffein, digitalis, calcium chloride.

Four days later, September 9th, the cat was brought back in much worse condition. At first it had shown improvement, but then had become rapidly worse.

CLINICAL EXAMINATION.—Intense dyspnœa. By percussion of the thorax: Found increased sounds at the top, dullness below. By auscultation, heightened murmur above and dullness below. Some 50 cubic centimetres of liquid were drawn from the thorax, and upon examination this was found to be similar to the liquid previously drawn.

DIAGNOSIS.—Chylous pleurisy.

OUTCOME.—Death from syncope a quarter of an hour after paracentesis.

POST-MORTEM EXAMINATION.—Marked subcutaneous fattiness. The peritoneum contained only a few cubic centimetres of milky liquid, but on the other hand was very fatty. All the viscera, including the lymphatic ganglia seemed healthy. The uterus was empty and seemed quite healthy, too. The pleura contained about 150 cubic centimetres of milky liquid and the pericardium about 5 cubic centimetres. Slight congestion of the pleura was noticed, but no fibrinous patches.

REMARKS.—Is there a plausible explanation to account for such discharges as these? Straus thinks that these kinds of dropsy are due to the passage of chyle into the cavity. Gineau and Letulle suppose that they come from the change of some purulent discharge into fatty substances. Winckel and Lancereaux put it down to filaria in the blood, and Debove thinks that their nature is chyliform.

In the first case reported above, pleurisy was undoubtedly caused by injury. As to its chylous nature it does not seem to be due to the opening of a large lymphatic vessel, when the position of the wound is taken into consideration; nor can it be attributed to a fatty transformation of a purulent discharge, since only a small proportion of leucocytes were found in the liquid.

In the second case reported above, the trouble cannot be put down to previous injury, as although the cat had suffered from a sore place on the abdomen two years before, it had been impossible to find any trace of even local peritonitis at the *post-mortem* examination. Moreover, the abdomen showed less important features than the thorax, where much more liquid was found and in which there were signs of pleural inflammation.

In our opinion these cases are due solely to secondary rupture of very large lymphatic vessels, itself caused by lymphatic stasis, which in its turn is due to a kind of thrombosis analogous to venous thrombosis, and of infectious origin. It will be noticed that in the cases reported these types of discharge appeared, if not in the beginning, at any rate very early in the illness.

A Curious Case of Renal Hæmorrhage.*

By Dr. MANGIN.

THE patient was a twelve-year-old mare of Lorraine breed, which had been in foal for five months. One night a neighbouring horse got

*(*Recueil de Med. Vet.*, Dec. 12th, 1927).

loose and kicked several others, and the next day the mare in question was found to be splashed with blood running from the vulva. This gave rise to fears of abortion. Moreover, other alarming symptoms supported this view: Temperature 95·2° F. (35·1° C.); discoloration of the mucous membranes; slow pulse; feeble bloody micturition, the urine containing numerous clots of blood; several ecchymoses accompanied by diffused œdema; and an extreme sensitiveness in the right lumbar region; all pointing to injury on this side, with the possibility of its having extended to the kidney and leading to hæmorrhagic nephritis.

The mare was treated with camphorated oil, adrenaline, and gelatinised serum, and in a few days showed so much change for the better that within three weeks a definite cure had been effected without abortion.

An Interesting Excision of one Uterine Horn after Fœtal Retention.

By GUY SUTTON, F.R.C.V.S.,

Kensington, London, W.

A VALUABLE bull-bitch was brought into hospital in August for assistance at parturition. She had been in labour many hours and had produced one puppy, minus its head. Later in the day, or rather early next morning, three more dead puppies were delivered with forceps. The possibility of one of the heads being still retained was discussed. It could not be felt, and it was assumed that the bitch had in some way detached it in her endeavours to deliver. She rapidly recovered from her ordeal, put on flesh, and was very well, with the exception of a thin vaginal discharge. In November she came under inspection again. A body the size of a large walnut could be felt through the abdominal wall, and with the finger in the vagina the same body could be felt, but always covered with mucous membrane. It could also be grasped with forceps, but gave the same feel to the touch; the impression received suggesting that the forceps were in one cornu and the object in the other. Greatly daring, the object was gently squeezed with a small pair of parturition forceps. It was slightly compressable. She still remained well, the discharge slight, and practically odourless. The bitch was frequently and copiously irrigated, and received numerous injections of pituritin intramuscularly. Early in December a radiograph was taken which revealed the object to be the missing head of the first born. Further attempts were made at instrumental delivery, and as these proved

unsuccessful, the owner's consent was obtained to open the abdomen. The suggested operation was to pass the head backwards, with the fingers in the abdomen, hoping that it might be grasped in the forceps and so extracted. The bitch was most valuable as a brood-bitch, and it was highly desirable to preserve her for that purpose. On exploration the uterine horn was found to be collapsed upon the fœtal head and firmly adherent to it. It was within the left cornu immediately behind the point of entrance into the body of the uterus. The whole horn and ovary on this side was thickened and inflamed. The only procedure likely to preserve the patient as a brood-bitch was to remove the left cornu, with its ovary. The small space which occurred between the fœtal head and the body of the uterus gave the opportunity to apply an occluding ligature. On severing here there was a very offensive odour and a septic stump seemed inevitable. An attempt to sterilize this was made by lightly cauterising with blunt-pointed scissors heated in a flame. The bitch showed practically no after effects of this rather heroic interference, and was asking for food within twenty-four hours. I advised that she should be given a year's rest before attempting to breed from her again, and I shall await the event with some anxiety.

This case gave occasion for team work. Mr. Ollerhead, M.R.C.V.S., first saw the bitch, Mr. Stainton, F.R.C.V.S., diagnosed the fœtal head, and was responsible for the radiograph, and Mr. George Robb, M.R.C.V.S., was the anæsthetist and generally assisted me.

Translation

Cancer of the Spleen in the Dog.*

(Sarcoma of the Fusiform Cells.)

By DR. V. BALL and L. AUGER.

Generalisation to the Liver and Mesentery.

In man cancer of the spleen is most often secondary. Primary cancer of this organ is exceptional. It is the same with animals.

In the spleen one may encounter, in animals as in man, secondary nuclei of all the malignant tumours of other organs and most often several secondary nuclei exist.

Primary cancer of the spleen is always a *sarcoma* or a *lympho-sarcoma*. *Primary epithelioma* of this viscus does not exist for the nature of this organ is exclusively conjunctive.

* *Revue Vétérinaire*, Jan. 1928.

However, under the name of *primary epithelioma* of the spleen in 1882 Gaucher described in man a primary cancer of this organ, which, according to actual and general opinion, is not an epithelioma, but an *endothelioma*, deriving endothelial cells of covering from the cavernous tissue of this viscus. This is what is known as the malady of Gaucher. It may be added that for certain authors endothelioma is only a variety of *sarcoma*. In the malady of Gaucher the spleen is hypertrophied, without prominences or neoplastic embossments, of a pale colour and hard consistence. This affection is not yet known in comparative pathology. Primary cancer of the spleen presents itself either under the isolated, circumscribed, nodular form, or under the diffuse form. In this latter case the spleen is hypertrophied and its tissue shows a greyish-yellow colour, but no prominent tumour exists.

Owing to the rarity of primary cancer of the spleen in animals we deem the present case in a Danish harlequin mongrel dog 8 years old worthy of publication.

Clinical Signs.—The patient was brought to us on account of thinness, which had begun about a month previously, and also abnormal development of the stomach region which was very rotund, especially behind the hypochondriac region. The general state of the subject appeared quite satisfactory in spite of the marked emaciation. Clinical examination revealed the presence of slight ascites and of an abdominal tumour behind the right hypochondria.

On the left side, too, a rounded and hard tumour was ascertainable.

The diagnosis was *abdominal tumour* without localisation.

The sacrifice of the animal was ordered.

Pathological Anatomy.—Opening of the abdomen revealed a *hæmorrhagic ascites*. The ascitic liquid was reddish, clear and its quantity about half a litre. The mesentery appeared riddled with small secondary cancerous nuclei, forming a regular seed bed. These nuclei were tubercle shaped or more voluminous, and showed the dimensions of a millet to a maize grain. Colour greyish or greyish yellow and altogether reminded one of *secondary miliary carcinosis*.

The spleen was the situation of a cancer greatly developed at the lower border and forming a strong projection slightly oval and flattened from side to side. The colour was greyish yellow or yellow, the consistence of the tissue firm, elastic, and on section it was lardaceous in appearance.

It measured $3\frac{1}{2}$ inches antero posteriorly, $2\frac{1}{2}$ inches wide and $1\frac{1}{2}$ inches thick. Its weight with the spleen was 575 grammes. The liver contained a large number of secondary cancerous nuclei and showed *a sarcoma with large fusiform cells*.

XUM

It is well to remember that there were three principal signs to aid diagnosis, which led to suspicion of cancer of the spleen; the enlargement, the perception of a globular or bosselated tumour on palpation, and finally emaciation and cachexia; and in this case there was also the hæmorrhagic ascitis. This is the second case observed by us with analogous clinical symptoms.

Abstracts

The Control of Poultry Diseases in the United States.*

By J. R. MOHLER,

Chief, Bureau of Animal Industry, U.S., Department of Agriculture, Washington, D.C.

THE subject of my remarks this evening was inspired by the Third World's Poultry Congress, held last month in Ottawa, Canada. This Congress was attended by over 4,000 members from 42 nations, including a number of veterinarians from the United States, Canada, and other countries as far away as Egypt. Twenty-four of these veterinarians presented papers before the Congress and three of them were selected as presiding officers at different sessions. The well-balanced distribution of time devoted to the five main topics—breeding, marketing, nutrition, extension, and last, but not least, diseases—showed an evident desire to deal with poultry problems in a broad and proper way, rather than to permit any subject of unusual or especially timely interest to dominate the discussions. There were 170 papers delivered in five simultaneous meetings, in different halls of the great auditorium, during the nine days of the Congress, which gave one a field of poultry information to draw from that covered every phase of the poultry industry. Acres of commercial exhibits at Landsowne Park, showing every known kind of feed, fence and fixture, made one realise forcibly to what extent the industry has grown. The immense live-bird exhibit, containing stately monarchs and their consorts of prize-winning pens from every corner of the earth, showed the widespread interest of breeders throughout the world. The

* Presented at the sixty-fourth annual meeting of the American Veterinary Medical Association, Philadelphia, Pa., September 13-16, 1927.

Reproduced from our contemporary, *The Journal of the American Veterinary Medical Association*, Feb., 1928.

federal Department of Agriculture demonstrated by detailed models the story of this country's mammoth poultry business, from the nest to world-wide markets; specialists told how our breeders sold 800,000,000 baby chicks last year, and the statisticians showed that our egg-production reached 2,000,000,000 dozen, or 760 eggs each second in 1926.

Everyone concurred that the Congress was an outstanding success in beauty, utility, hospitality, and achievement and would exercise a very profound influence on poultry leaders in all countries. Further, as the most impressive and important event in poultry history, it is bound to exert a very great impetus on the development of the industry everywhere.

The reflection from all these important features of the Congress has already been felt in the United States, and it is my desire to take advantage of this reaction by presenting briefly what we as veterinarians must do to keep our flocks healthy in order that meat and egg-production shall not diminish. In any consideration of poultry disease control work, we must bear in mind that we are dealing with fowls, not only from a pathological standpoint but as commercial units on which a great industry is based.

The United States is the most important poultry-raising country in the world, producing more than one-third of the world's supply of poultry and eggs. The annual value of these products is considerably in excess of $1,000,000,000, amounting to about 16 per cent. of the total value of live stock and its products for 1926, and being surpassed by only two other branches of the live stock industry—the dairy industry, with 40 per cent., and the swine industry, with 22 per cent. of the total.

Poultry Industry makes Rapid Strides.

Although co-existent with the earliest career of the colonists of North America, the poultry industry up to comparatively recent times has constituted a rather incidental enterprise of the American farmer, usually managed by the housewife or children of the family. As a rule, the occurrence of disease under these conditions was either entirely unsuspected, as the fowls were allowed the run of the farm and shifted largely for themselves, or else regarded as of so little consequence as to merit no particular concern. An occasional dead hen was thrown unceremoniously into the hog-pen or perhaps left to lie where the unfortunate creature had expired, attended only by such obsequies as might be offered on the part of buzzards, rats or other disease-disseminating scavengers. The last decade, however, has witnessed an amazing change in the scope and methods of poultry

XUM

and egg-production, as the industry has rapidly forged to the front line of dignified commercially productive enterprises. This development of the industry has been aptly termed one of the romances of our age. No longer is the humble hen an incidental, uninteresting and obscure member of the farm family, left to the chance fare that might fall to the ground from the corn-crib or manger, but she is in many instances a recognised asset, a chief source of income, and as such is pampered and favoured with the best of feed, shelter and attention. The legal recognition of the poultry industry has scarcely kept pace with its unprecedented growth in commercial importance. Laws of the land relating to live stock have frequently been so interpreted as relating only to domestic animals of the mammalian class but not to the feathered bipeds.

This lack of a legal status as regards the poultry industry has been one of its most serious handicaps. It is partially because of such a lack that, thus far, little definite information is at hand relative to the geographical distribution of various poultry diseases, nor are any statistical data available as to the ratio of mortality of any particular disease. In individual cases, such as that of avian tuberculosis, the Bureau has been able to engage in a rather extensive survey, with much valuable information forthcoming as a result. However, under the laws governing our activities the Bureau has thus far been restricted in its sanitary policing as regards the nation-wide poultry disease problems. Comprehensive and far-reaching control measures have been impossible of legal enactment or enforcement, and the keen solicitude of the nation's veterinary staff has been technically unable to find expression. In spite of these weighty handicaps, the young and vigorous industry has continued to press toward the fore, until at present our chickens are increasing relatively faster than our population.

European Fowl Pest.

The highly beneficent possibilities latent in legislative enactments in favour of the industry were probably not fully visualised until such legislation became an urgent necessity. This occurred in the winter of 1924, when, for the first time, the European fowl pest was found to be prevalent within our boundaries with no public funds available for combating it. In response to urgent appeals, Congress promptly enacted emergency legislation empowering and financing drastic eradicative measures. A fine spirit of co-operation on the part of the various states involved, the poultry-raisers and the private concerns interested in the traffic in poultry, made possible a rapid and effective eradication of what threatened to be a nation-wide and possibly an age-long scourge. From a pathological standpoint control measures

were relatively simple. They consisted essentially in inspection to detect infected and exposed fowls, prompt slaughter, disposal of dead fowls by burning or deep burial, and disinfection of premises and equipment. Even though nine states, comprising altogether an area larger than some European countries, were involved, the outbreak was promptly eradicated. Moreover, the loss of affected fowls was negligible in comparison with the enormous poultry industry of the United States.

Yet the outbreak was sufficiently serious to show in a most convincing manner the importance of the nation's poultry industry and its intimate relation with other industries and public welfare. Owing to the risk in accepting live poultry in the affected regions, prices underwent a sharp decline and there was interruption in normal marketing, owing to the need for disinfecting coops, cars and sundry equipment. Altogether over 8,000 railroad cars were cleaned and disinfected during the outbreak. More than that, a number of poultry-killing establishments closed temporarily, throwing their employees out of work. Thus the influence of the poultry industry in many commercial fields is evident.

Combating such a poultry disease on a large scale involves adequate funds as well as a competent personnel, legal authority, equipment for cleaning and disinfecting, and the establishment of proper administrative procedure for doing the work promptly and thoroughly. In the instance cited, the Congress acted quickly, appropriating $100,000 to combat this deadly malady. This appropriation was the first which any Congress of the United States had made specifically for the actual field control and suppression of a poultry disease. That which has been done for fowl pest can be done for diseases in general which are inimical to the health of poultry. This fundamental postulate affords a motive which is itself finding expression and in the last appropriation bill Congress again recognised the importance of controlling poultry diseases. The Bureau this year was given authority to use funds for the control and eradication of poultry diseases as well as for the animal diseases specified in the past. Although no additional funds were appropriated, yet such specific recognition is gratifying and marks an important step in the effective control of poultry maladies. Fowls are now recognised as being worthy of the same official consideration as the larger domestic animals. This condition has come about in much the same manner that the various agricultural experiment stations and colleges have undertaken poultry work at dates usually later than similar work for horses, cattle, swine and sheep. We therefore venture the hope that, given the added assurance of a friendly system of federal regulation, the poultry industry is on the

XUM

eve of a new day of prosperity and development that will far eclipse its best achievement of former years.

Avian Tuberculosis.

Essentially the same trend of sentiment is occurring in the attitude of the veterinary profession toward the poultry business. Formerly the value of a bird or even a flock was too small to justify the employment of a veterinarian for treating a diseased condition. It was cheaper and more expedient to destroy infected fowls than to treat them. Recently poultry diseases have received more and more attention and study. This is especially true of the infectious diseases. No discussion of the poultry industry would be complete without reference to the subject of avian tuberculosis. It was determined many years ago that the disease existed in poultry in some sections of the country to a considerable extent, and it was also known that it was transmissible to swine. However, it was not until bovine tuberculosis had been eradicated from a number of counties that a check upon the extent of its transmissibility to swine became possible.

In certain counties which, under the general plan of tuberculosis eradication, had been established as free from tuberculosis, checks were obtained upon shipments of swine sent to market centres, and it was ascertained that a greater percentage of tuberculosis was being found in these shipments of swine than had been anticipated. This led to a more detailed study of the poultry problem, resulting in investigations by Dr. L. Van Es, of the University of Nebraska, and others. These studies disclosed the fact that a much larger percentage of avian tuberculosis was being transmitted to swine than had been previously considered, due undoubtedly to the fact that avian tuberculosis itself had been stealthily increasing much faster than had ever been anticipated.

In connection with these studies, the Bureau established a system of flock inspection in connection with the testing of herds of cattle. It is interesting to note that last year 211,675 flocks, containing approximately 16,500,000 fowls, in 34 states, were inspected. Approximately 12,000 of these flocks, or 5·7 per cent., were found to be infected with tuberculosis. These inspections were made in the course of the routine testing of cattle. It is believed that the information disseminated to poultry-owners through the medium of these inspections of flocks will prove of considerable value in the final control of the disease.

A questionnaire was also sent to several thousand poultry-owners through the Bureau field offices located in the respective states. More than 3,100 owners replied, 43 states being represented. The purpose

of the questionnaire was to ascertain, if possible, under what conditions poultry flocks were being maintained, and the possible connection such maintenance conditions may have had with the transmission of the disease from flock to flock. A general study of all the figures afforded by the survey furnished the following conclusions: (1) That the poultry industry is not fully informed relative to avian tuberculosis and that much more educational work is vitally necessary; (2) that no definite conclusions can be deducted as to the most frequent mode of transmission of avian tuberculosis from flock to flock.

As a result of these inspections and surveys in connection with the incidence of avian tuberculosis, we know very closely the extent of this disease in every part of the United States. In fact this information has been mapped by counties and its national aspects may be seen at a glance. It discloses the fact that the eastern and southern states are comparatively free, but that in the middle western states, where almost 50 per cent. of the nation's chickens are located, the disease exists to an alarming extent. The result of this knowledge emphasises the necessity of control measures looking to the complete eradication of this form of tuberculosis. The states in which considerable infection exists have been actively preparing to inaugurate these measures, and I am glad to say that, with some variation in detail, a number of them are now embarked upon this campaign.

The control measures being adopted involve, in principal, the education of the poultry-raiser as to the need of sanitation and the best poultry husbandry methods; the physical inspection of the flocks; some tuberculin testing in ordinary farm flocks where a diagnosis can be obtained by no other means; the destruction of such diseased flocks; the cleaning and disinfection of infected premises; the careful selection of healthy birds; and the raising of new flocks on new or disinfected ground. It is realised, as was the case in the early stages of the bovine tuberculosis eradication work, that the methods will probably be improved from time to time. It is noteworthy also, as was the case with live stock organisations in the early steps of the bovine campaign, that the poultry organisations are lending their effort to the stimulation of effective working plans. In order that the poultry-grower may have his attention drawn vividly to what avian tuberculosis is and how it may be eradicated, a moving picture entitled "Fowl Tuberculosis" is now being prepared by the Bureau for general distribution.

Bacillary White Diarrhœa.

Other poultry diseases also have received study of the Bureau of Animal Industry. While there is sometimes temporary chagrin in

finding former methods and beliefs erroneous and undependable, I am confident that the poultry industry will gladly accept and apply the results of competent research in controlling disease. No disease problem is of greater moment than bacillary white diarrhœa of chicks and its corollary the pullorum infection of hens. The former strikes a deadly blow at the very fountain-head of the industry's young life. A unified organisation of state agencies responsible for the supervision and interpretation of standardised tests with proved antigens is essential for the accomplishment of definite, dependable results in controlling this most dangerous infection. This is merely a case of applying the same principle of protection to poultry that has been successful in human medicine and in treating the larger domestic animals. In this connection an outstanding event is the recent appointment of a Bureau committee to co-operate with a committee of the National Poultry Council in making an extensive study of white diarrhœa, with the view of developing practical principles of control.

Parasitic Diseases.

These necessarily brief remarks concerning bacterial diseases apply also to the numerous poultry ailments caused by parasites.

The subject of poultry parasites has received and is receiving a great deal of attention and investigation in general regarding parasitism as a highly important cause of losses among poultry. The losses are especially heavy among chicks, as are losses from parasites among young animals of all sorts.

Many workers have devoted most of their time to the more commonly recognised and widely distributed parasites, such as the large roundworm, the cecum worm, and the tapeworms. Since the limited resources of the Bureau will not permit any large amount of duplication of work done elsewhere, its energies have been devoted largely to investigations of parasites likely to be overlooked in routine examinations, and in connection with this project it has already found a half-dozen worm parasites causing deaths and losses among chickens, turkeys, ducks, geese and pigeons. Because of their small size, or for other reasons, these highly pathogenic parasites had never before been found on this continent. A field survey in the South indicates that some of these parasites are widespread and important in that region, and other evidence indicates that some of them extend from the eastern coast to the Rockies. Doubtless they are widely prevalent over the country.

These findings represent two years' work, following up the preparation of a large monograph on the nematode parasites of poultry. Some of these parasites have very unusual life histories and methods

of attack. The nematode, *Syngamus trachealis*, which causes the condition known as gapes, is one of the many parasites now catalogued in a scientific rogues' gallery in our laboratory. Turkeys very commonly harbour gape-worms and for this reason they are important sources of infection for young chicks, especially since turkeys themselves rarely show indications of the presence of the parasite. Yet when turkeys and chicks are reared together, there is difficulty in avoiding losses from gapes among young chicks. Such basic research is essential before it is possible to develop adequate control measures or even to recognise the presence of parasites now probably overlooked, even where they are destroying flocks. The growth and concentration of the poultry industry are increasing infections and parasitisms and our excellent transportation facilities are serving to distribute parasites and diseases far and wide.

Other Poultry Diseases.

Time will not permit references to all the diseases which occur in the United States or to specific methods of their control. Some will respond to immunization measures. For instance, there are now on the market certain products which are being used successfully against such diseases as roup, diphtheria, and pox, but there are many factors which influence the degree of immunity produced. Such vaccines, of course, should not be used if any other infectious disease is present in the flock. This is one reason why such methods of preventive vaccination should be administered only by a veterinarian.

Research work in feeding has demonstrated the relative importance of protein, minerals and vitamins in rations for growing chickens and laying hens. Only a beginning has been made, however, in respect to determining the proper balance among these proteins, minerals and vitamins. A tremendous field of research is open to the nutritional investigator in working to produce completely balanced and economical rations for our poultry and thereby eliminate many of our nutritional types of disease. The proper method of controlling these various nutritional diseases involves the necessity of distinguishing the symptoms and the application of the particular dietetic treatment appropriate to each form. Thus nutritional roup yields to the feeding of cod-liver oil, green feeds, egg yolk or butter fat, all of which are rich in vitamin A, while in rickets—a deficiency disease involving a faulty calcium metabolism—cod-liver oil in the early ration and later an allowance of shell or ground bone constitute the rational treatment.

XUM

Fundamental Principles of Control.

In conclusion, I feel strongly that the most effective control of poultry diseases in the United States must be based largely on the efforts of poultry-owners themselves, which naturally would include the employment of the veterinarian skilled in poultry diseases. Such control is first an individual problem. And only when individuals cannot or do not handle a dangerous situation is there need for governmental or state action. The objects of such action should be threefold : to protect domestic poultry from foreign contagion, to prevent the spread of poultry diseases from state to state, and to eradicate communicable diseases within a state when they appear.

These are essential functions for the protection of any state or country engaged in the production of poultry and poultry products, in order to conserve this valuable source of food and revenue. There can be no doubt of the mutual advantage that would come from closer co-operation in these matters.

Among the fundamentals which deserve special consideration are the following :—

Each poultry-raising state should establish a competent veterinary poultry service, which should include poultry research laboratories and competent workers.

Laws and regulations should be framed with the object of preventing the spread of communicable diseases within a state, the transmission of infection from one state to another, and the introduction of infection from abroad. They should be based on dependable scientific information and not on business expediency nor for the purpose of furthering commercial ends.

Thorough surveys should be made by the veterinary organisations of each state, at regular intervals, to ascertain what contagious diseases and harmful parasites are present in the state.

There should be an exchange of official information between states, at regular intervals, covering the results obtained through surveys and research work.

Funds should be constantly available to control or eradicate outbreaks of communicable diseases, especially the destructive foreign pests.

Meanwhile, the organisation of the Bureau is wholeheartedly pledged to the fullest exercise of such functions as the Congress of the United States shall bestow upon us for the safeguarding of the poultry industry of the United States.

A Study of Infectious Abortion of Mares in Japan.*

An Outbreak on the Island of Hokkaido in North Japan.

By K. KASAI, C. KOHANAWA, K. OGURA and S. ITO.

(*From the Animal Hygiene and Micro-biological Institute of the Imperial Hokkaido University at Sapporo.*)

THE first record in literature of infectious abortion of mares in Japan was made by Miwo, who referred in 1916 to an outbreak at the small town of Hachinche in the province of Awomori. Afterwards Migita and Kii recorded cases. Also we made bacteriological examinations since 1921 on the epidemic which prevailed on the island of Hokkaido.

The conclusions arrived at are as follows :—

1. Since the year 1921 infectious abortion of mares has prevailed in the different horse breeding establishments of the Island of Hokkaido in North Japan.

2. It was quite characteristic of this outbreak that the pregnant mares suddenly aborted without preliminary symptoms, the abnormal afterbirth was expelled, and the recovery of the aborting mares retarded. In general the abortion occurred in the later stages of pregnancy.

3. *Post-mortems* of the aborted foals showed only hæmorrhagic and septicæmic changes.

4. From the aborted foals which were autopsied by us, we could isolate a rod-shaped bacillus and bacillus coli and streptococcus ; a rod-shaped bacterium from three cases and bacillus coli and streptococcus from one case. From our examinations on the morphological and biological attributes, staining and culture results of the first named bacterium it was undoubtedly identical with the "*salmonella abortivo-equina*," which in Europe and America has been found by different investigators. We did not produce abortion experimentally with the bacillus concerned.

5. Although the bacilli were rod-shaped with two rounded ends, they had the inclination to grow polymorphiously in artificial culture media and showed cocci and long filament forms. The bacilli were easily stainable with aniline dyes and gram negative. Often a few chromatin-like fine nuclei were found in the bodies of the bacteria if they were not coloured too deeply.

6. The bacilli had the tendency, according to different stocks, to form a different number of flagellae, one stock showed one or two flagellae on an average, other two stocks four or five. Although the

* Extract from the Journal of the Central Veterinary Association of Japan, 39/7/1927. Pp. 619-668.

XUM

salmonella abortive equina in comparison with other salmonella bacilli possesses the smaller number of flagellae, we had two individual stocks from which we produced varieties free from flagellae. The flagellum form of this bacillus was generally coarse wavy but not unfrequently there were also bacilli in which fine and regular wavy undulations were noticed. In cultures the bacilli at times formed giant flagellae.

7. The bacilli showed lively forward movement by turning of the body; but frequently one could find those which could advance quite smoothly without turning the body.

8. The cultures from the bacilli which we isolated coincided in all particulars with those described by other authors. They grew well on nutrient media with the addition of gall, urine or dung. On blood agar they grew excellently and showed a high degree of hœmolysis. As regards hœmolysin the bacteria appeared much more susceptible to rabbit erythrocytes than to horse erythrocytes.

9. The colonies of bacilli showed damp and smooth on agar when freshly isolated but through artificial culture they changed gradually and became dry wrinkled. As this peculiarity of wrinkle formation was not quite constant we saw many deviations of it. This ability for wrinkle formation could be artificially influenced to a high degree. For instance, a wrinkled stock through blood agar culture became smooth and from a smooth stock one could very easily obtain a wrinkled one—whilst after long continued fluid culture little pellicles formed which on firm media could be further grown.

10. If one further continued the separated cultivation with the wrinkled stock, there arose two different kinds of bacilli; one stock with unwrinkled damp colonies and another with wrinkled dry colonies. One could obtain the two previously described stocks of bacilli with relatively fixed constant attributes, if one repeated the aforementioned process and always the wrinkled selected from the wrinkled stock, and the smooth from the smooth stock. We called the first-named "the wrinkle stock" and the last "the wrinkless stock."

11. We examined the carbo-hydrate splitting ability of the bacilli in relation to 29 carbo-hydrates. Bacilli isolated by three of us proved positive in eight kinds of C.H. (mannite, arabinose, xylose, dextrose, levulose, galactose, mannose, and maltose), but negative in 19 kinds (erythrit, adnit, dulzit, innosit, rhamnose, trehalose, saccharose, lactose, raffinose, soluble starch, dextrin, innulin, glykogen, salicin, phloridin, sapponin, amygdalin, and digitalin). In glycerine and

sorbin they were not constant, but in long continued cultivation therein, they were both positive.

12. The bacilli had neither the ability to form indol nor sulphuretted hydrogen.

13. The bacilli were capable of resistance and remained alive on agar at room temperature for a year and a half ; on bonillon almost a year ; but on bonillon-glycerine the continuance of life was shorter ; the greater the addition of glycerine to the bonillon, the shorter the life. They withstood drying from one to two months.

14. The bacilli died on heating to 60° C. within five minutes, and within 30 minutes at 56° C., but they still lived after an hour at 50° C.

15. The bacilli died within five minutes in 1·5 per cent. carbolic, 0·01 per cent. caporit, 0·002 per cent. sublimate ; within 30 minutes in 1 per cent. carbolic, within 15 minutes in 0·005 per cent. caporit, and 0.001 per cent. sublimate solution. But they still lived for an hour in 0·005 carbolic, 0·0005 caporit and 0·0001 sublimate solution.

16. Since the blood serum of the aborting mares showed rather plainly agglutination and complement fixation against the bacilli, we could employ both reactions as aids for the diagnosis of the malady.

17. We found no differences between the bacilli found by us in the Hokkaido outbreak and the bacilli found by other authors in other regions of Japan, as regards agglutination and complement fixation. It also appears that all salmonella stocks which were found in different regions of Japan are serologically quite similar bacilli.

18. All stocks of salmonella abortive equina in Japan had almost the same relative power of splitting carbo-hydrate with the exception of a few kinds of C.H. as dulzit, rhamnose and trehalose. By reason of this latter peculiarity we could divide the salmonella bacilli of Japan into the following four varieties :—

(1) The variety not splitting dulzit, rhamnose and trehalose.
(2) Those splitting the above carbo-hydrates.
(3) Dulzit and trehalose splitting, but not rhamnose.
(4) Dulzit and rhamnose splitting, but not trehalose.

Shortly it may be said : that the three stocks of bacilli which were found by us in Hokkaido in aborted foals, coincided in regard to the morphological and serological attributes and in their serological peculiarities and ability for splitting carbo-hydrate with those found by other investigators in other regions of Japan, and further with the stocks of salmonella abortivo-equina which have been found in Europe and America.

XUM

Comparative Study on the Resistance of Erythrocytes of Healthy Domestic Animals.*

By CHIUSHI KOHANAWA and ASATARO KADONO,

Veterinary Institute, Hokkaido Imperial University, Sapporo, Japan.

We studied the resistance of the red blood cells of 12 healthy domestic animals (horses, cattle, swine, sheep and goats) respectively by the same method and under the same conditions. As examination method we took Hamburger's method in the essential points, modified slightly as conditions demanded. The blood was taken from the jugular vein in all the animals except swine, in which the blood was taken in a slaughter house directly from the aorta (it consists chiefly of arterial blood). We prepared the NaCl solutions from 0·33 to 0·78 per cent. differing by 0·01 per cent. respectively with sodium chloride (Merck). The process of our examination is as follows: 5 c.c. NaCl solutions were put into each of the centrifugal tubes pointed at the bottom and two drops of the defibrinated blood which had been kept in an ice box for one hour beforehand, were put into the NaCl solution in the tubes with the same pipette and then well mixed and put in an ice box for three hours. Then the tubes were taken out from the ice box and all put in the centrifuge for five minutes and the results were read.

1.—The results of the foregoing experiments are summarised in the following table:—

Animals Examined	Size of Red Corpuscles.	Red Corpuscles. Millions per cmm.	Minimum Resistance (Average).	Maximum Resistance (Average).	Whole Resistance Width (Absolute Value).	Average Resistance Width (Absolute Value).
Horses ..	5·5 μ	7·695	0·55-0·60(0·56)	0·40-5·49(0·44)	0·40-0·60(0·20)	0·44-0·56(0·12)
Cattle ..	5·6 μ	6·611	0·55-0·60(0·57)	0·40-0·45(0·42)	0·40-0·60(0·20)	0·42-0·57(0·15)
Swine ..	6·2 μ	6·629	0·57-0·66(0·61)	0·34-0·43(0·44)	0·34-0·66(0·32)	0·44-0·61(0·17)
Sheep ..	4·9 μ	16·529	0·64-0·70(0·66)	0·45-0·57(0·50)	0·45-0·70(0·25)	0·50-0·96(0·16)
Goats ..	4·1 μ	17·494	0·69-0·77(0·72)	0·47-0·59(0·52)	0·47-0·77(0·30)	0·52-0·72(0·20)

2.—The minimum resistance. The horses show the greatest resistance and resistance decreases in this order—cattle, swine, sheep and goats. Swine show the greatest individual differences and goats,

* Author's abstract from *The Journal of the Japanese Society of Veterinary Science*, Vol. IV, No. 3.

sheep, cattle and horses less in order. In general the minimum resistance is proportional to the size of the erythrocytes and in inverse ratio to the erythrocyte number.

3.—The maximum resistance. The cattle show the greatest resistance, and resistance decreases in this order—horses, swine, sheep and goats. Goats and sheep show the greatest individual differences and swine, horses and cattle less in order. Generally the maximum resistance is also proportional to the size of the red corpuscles and inversely proportional to the number of the erythrocytes.

4.—The resistance width. On the whole the swine show the greatest and goats and sheep the next; cattle and horses the smallest. On the average the goats show the largest and in the next come swine, sheep and cattle, while horses show the least.

5.—In short, in the resistance of erythrocytes, cattle and horses rank first, showing hardly any difference; swine are intermediate, while sheep and goats show the least resistance.

The Swedish Slaughter-house System.*

Swedish Slaughter-houses an Ancient Institution.

To find the first slaughter-house edict in Sweden we have to go back as far as the year 1622. On May 7th, 1622, Parliament prescribed customs duties and town duties to be levied on all food taken into a market town, or for sale at fairs and market places, and in December of the same year certain regulations were issued also, including detailed provisions with respect to hygienic requirements. Thus, killing was prohibited in other places than in the "*authorised slaughter-houses of the city.*" After the killing of the animal due care was to be taken that the meat was absolutely clean. After that, it was brought to a shed where examination was made as to whether it was "as wholesome as it ought to be." Killing for domestic use was also to be carried out in the slaughter-house.

Thus we find that the hygienic aspects of slaughtering were taken into consideration in Sweden as early as 300 years ago. On the lines laid down in 1622 the Swedish slaughter-house system has developed into its present state, a state which has reached such perfection as regards hygiene and modern conveniences as to constitute an example for others. Swedish humane killing methods are well known all over the world.

* Abstract from "The Pig Industry and Bacon Curing in Sweden."

Government Regulations Regarding Hygienic Slaughter-houses and Veterinary Inspection.

As already observed, the Swedes have long realised the importance of highly perfected hygienic methods with regard to slaughtering and slaughter-houses. This feeling is clearly expressed in a new law (passed in October, 1913) providing for the inspection of meat and of slaughter-houses.

The veterinary supervision of the Swedish export factories is very strict and efficient. The veterinary experts are State officials responsible to the Royal Board of Health. This Board issues instructions which they are obliged to follow.

The veterinary supervision begins with an examination of the pigs sent for slaughter, the veterinary expert discarding all that are in any respect unsuitable.

Throughout the slaughtering process the pigs continue under veterinary supervision and the inspection of the flesh and organs, etc., is carried out at the same time. After the carcasses have been " passed " and branded by the veterinary expert, the sides are ready for curing.

As regards inspection and marking of meat and by-products intended for export from the Kingdom, the Government's Decree of October 10th, 1913, with respect to export factories and other private slaughtering establishments under public control holds good.

Buildings.

" Slaughtering establishments . . . should be well situated. Special rooms shall be arranged for the killing of the animals as well as for the preparing and storing of meat and by-products. Where the cleaning of intestines is carried out within the slaughter-house it should be performed in a separate room. The destruction apparatus, and (should there be one) the sterilization apparatus, as well as gas motors or other power machinery which might contaminate the air, should be placed in special rooms. Adjoining the hall used for the slaughtering there should be a room with necessary accessories where the staff can change their clothes and wash.

" Sties, manure-box and such like conveniences should be placed at due distance from the other localities of the slaughter plant.

" The walls of the slaughter-house should be made of stone, iron or other materials of a similar description and be arranged so that they may be easily cleaned and thoroughly washed. The floor should be made absolutely air-tight by covering with a suitable material. The floor should be on a higher level than the surface of the neighbouring ground and should be so arranged that the waste water may easily run off to a drain pipe. In all the rooms of the slaughter-house a water

supply and adequate ventilation arrangement should be installed. The room intended for the slaughtering should be provided with a sufficient number of windows for the obtaining of full daylight as well as with the requisite artificial light.

Veterinary Inspection.

" The inspector of meat should be a licensed veterinary surgeon and should have studied for at least two months at a public slaughter-house within the Kingdom of Sweden or should have made studies, approved by the Royal Board of Health, at a slaughter-house abroad.

" The inspector has to see that the ordinance of the Government referring to the fittings and the management of the slaughter-house is duly observed. The regulations imposed by the inspector have to be immediately obeyed by the proprietor and the staff of the slaughter-house.

" When pigs or other animals are to be killed the inspector must examine the animal within 24 hours before slaughter *and* as soon as possible after the slaughter and cutting. The inspection should be carried out in full daylight or by a sufficiently strong and in other respects suitable artificial light. The inspector must be present in person at the killing of the animals.

" Meat in general, head, tongue, lungs, heart, liver and kidney should be marked with a stamp indicating that they have been duly approved, provided they have been, at this inspection, found suitable for human food. In judging their suitability for human food the inspector has to comply with the prescriptions of the Board of Health.

" All meat obtained from pigs killed at the public slaughter-houses or at State inspected bacon factories is subjected to an exceedingly severe microscopical examination with reference to the presence of trichinæ (Trichinosis). The examination is performed in accordance with the regulations of the Board of Health.

" Fixtures and instruments should be kept in a clean condition. Meat or by-products intended for human food should be cut, preserved and stored as well as prepared and packed in a way fully satisfactory from a hygienic point of view.

" The rooms within the slaughter building that have been used during the course of the day should, after use, be carefully cleansed with water. The contents of the belly and the bowels of the pigs should, at every slaughtering, be gathered into well-covered, movable receptacles or carts, and should after slaughtering, as soon as possible, be taken out of the premises of the slaughter plant. Matters that might give the meat or the by-products a strange odour or taste or hasten their putrefaction or otherwise make them unfit for human

XUM

consumption, must not be kept so near the rooms used for the slaughtering or for the preparing and storage of the meat and the by-products as to create inconvenience in these respects.

Regulations of the Custom-House.

"The Customs Authority of the port of export must see that each consignment of meat leaving for abroad is accompanied by an inspector's certificate and that the consignment corresponds, as regards the number and appearance of its different parts, with the statement of the certificate. Should there be reasons for it, the custom-house must in addition ascertain whether the meat or the packing is duly stamped or marked. If the meat on arrival at the port of export is loaded on a railway wagon or part of a railway wagon that is sealed, the said wagon or part of wagon should not be opened except for examination in these respects. The custom-house shall append to the above-mentioned certificate a note of the examination performed.

"If the meat is not accompanied by the certificate prescribed, or if the meat or package is not duly stamped or marked, the Customs Authority must stop the exportation and immediately apply to the inspector in question, in order to have the error rectified if possible. However, this application should not be made, if the custom-house considers that the case comes under the following clause. If it does, the official must report the matter immediately with a view to legal proceedings.

"Anyone who exports or tries to export meat from the country without the meat or packing case being stamped or marked in the way prescribed in the above-mentioned ordinance must pay a penalty varying from 10 to 1,000 Swedish kronor. He also forfeits the commodity in question and, if it cannot be brought back, is fined a sum equal to its value."

Abstracts of Current Literature

Ernst, Dr. W., and Hahn, H.—Further Communication on Borna Disease of the Horse and Malignant Catarrhal Fever of Cattle.—*Münch. Tier. Woch*, 1927, Vol. 6.

ENZÖOTIC encephalitis of the horse, known as Borna disease, occurs also in other breeds of animals as a result of natural infection. The authors found in two sheep, which came from a herd in which 21 animals had been attacked with enzöotic encephalitis, not only

typical perivascular infiltrates and cell inclusions in the brain cells, but that these could also transmit the disease to rabbits.

Also they found lesions in the brain of a wild roebuck corresponding anatomically, pathologically, and histologically, to those of Borna disease. In the brain of an affected cow they also found small limited tissue infiltrations in the nucleus caudatus and also diapedesic hæmorrhages in the Ammoushorn, but typical vessel infiltrations and cell inclusion bodies were absent. But despite this non-typical Borna finding artificial transmission to the rabbit was successful, so that the diagnosis of Borna disease was assured. As to the method of infection nothing decided has been asserted. Probably the virus passes up the nose into the olfactory bulbs and from these infects further portions of the brain. Artificial transmission to the rabbit is best brought about by intracerebral inoculation of suitable material. Successful transmissions in this way were done with brain, blood, saliva, ocular fluid and vitreous humour of sick animals.

Less successfully, transmissions of Borna disease to the rabbit were made by intravenous, corneal, intraocular, and (with massive doses) by subcutaneous, nasal, and intraperitoneal, inoculations; as also by feeding with virus-containing material.

Animals further susceptible by experiment were sheep, fowls and rats, but not mice. The disease can be conveyed from the mare to the foal in utero, but not in every stage of the disease.

The chief situation of the virus is in the brain and spinal marrow. The virus can also be found in different other organs, secretions and in the blood in animal inoculation.

The specific pathological, anatomical and histological signs are found in the brain, especially in the grey substance (nucleus caudatus, Ammoushorn). Still affections of the white brain substance as exclusive tissue changes are found.

Typical clinical symptoms of Borna disease not being present and even absence of vessel infiltrations and cellular inclusion bodies do not absolutely exclude Borna disease. In mass infection of experimental animals cell inclusion bodies could be found in the protoplasm of the ganglion cells. The size of the inclusion bodies varied up to the limit of visibility.

Very interesting are the authors' findings *in cases of malignant catarrhal fever of cattle.*

Of five cases examined, which all died after three to eight days' illness, four showed vessel infiltrations in the Ammoushorn and nucleus caudatus typical of Borna disease, whilst the fifth case showed only slight perivascular œdema round the capillaries with a few

XUM

leucocytes. Also cell inclusions were found in three cases similar to those seen in the horse, only relatively smaller.

The inoculation of rabbits from the brain of these cows gave them typical Borna disease and the *p.m.* findings showed typical lesions Both authors believe from this result that Borna disease in the cow not only declares itself as staggers, but as malignant catarrhal fever.

The possibility of immunisation against Borna disease appears to be within reach. At least experimental animals (rabbits) secured a high degree of immunity by means of several subcutaneous or intravenous inoculations of diluted Borna virus containing material. It lies absolutely within the region of possibility that by post infectional inoculations the disease, as in rabies inoculations, can be suppressed.

News

Running a Dogs' Club—Twopence a Week Saves from the Lethal Chamber.

By HON. ORGANISING SECRETARY.

At this time of the year those who work among animals belonging to poor people are faced with the disagreeable problem of raising money for the renewal of dog licences. No one likes charity, least of all humble dog-lovers, who are as ready as more fortunate folk to make sacrifices for their pets. Yet all too often the alternative lies between charity and destruction.

An experiment carried out during the past year at the Animals' Free Dispensary, Kensal Road, in one of London's poorest neighbourhoods, has shown a way by which voluntary workers can help dog-owners to help themselves. A Dogs' Club has been founded, membership open to any dog, with a subscription of twopence a week. Each dog on joining is given a membership disc to wear on his collar. This disc bears a number on one side, and on the reverse, "Dogs' Club, 97, Kensal Road, W.10." The police have accepted the disc as an identification, and all wearers are secure against the perils of a "stray." The police ring up the Club when a member is brought to the station, give the number on the disc, and are told in reply the owner's name and address. In this way many family friends are restored to their homes, often direct, and sometimes after a day or two's free lodging in the Club.

Each owner of a Club dog has a card numbered to correspond with the disc, and weekly contributions towards the annual licence are entered on the card. Nearly a hundred fully-paid members are receiving new licences this January, and as many more puppies below licensing age, have begun making provision for their licences when due. This, however, is one aspect only of the work of this Free Dispensary, run as a branch of the Animals' Help Society. All kinds of pets are cared for. There have been over 9,000 treatments during the year, the patients ranging from horses to pet mice, and from tortoises to geese!

Among the many services rendered to animals may be mentioned free provision of "running leads" for chained dogs, so that they can get reasonable freedom and keep free from rheumatism; and simple supports for kennels, to raise the dog's sleeping place off the cold ground. Cold, damp, kennels are the commonest cause of pneumonia. Poor people are just as fond of their pets as other classes: all they stand in need of is help and advice in making their pets' lives comfortable, and their closing hour as humane as possible.—B.S.

The Marcelin Berthelot Centenary.

In connection with the centenary of Marcelin Berthelot, a lecture on his life and work was given by Doctor Moureu, Member of the Institut de France and Professor in the Collège de France, at the London Day Training College on February 11th. Professor Moureu, who fills the Chair of Organic Chemistry once held by Berthelot, gave a brief survey of the many fields of inquiry opened up by Berthelot's pioneer work in agriculture and chemistry, and referred to the diversity of his researches, which included a history of chemistry from the earliest times.

Dr. Emil Mond acted as Chairman of the meeting, which was honoured by the presence of His Excellency the French Ambassador. Several British scientists and representatives of various societies were also present, Mr. C. J. Paysant, B.Sc., of the Chemistry Department, representing the Royal Veterinary College of London.

Dinner and Presentation to Capt. Ross Grant, B.V.Sc.

The departure of our Australian colleague, Capt. Ross Grant, B.V.Sc., who has for the past five years so satisfactorily looked after the interests of the Australian meat importation industry on behalf of the Australian Government, is being made the occasion for a dinner

XUM

given in his honour, and a presentation token of the good will and warm-hearted esteem with which he is regarded by all with whom he has come in contact during his stay in this country. The dinner, which is organised by certain authorities in the meat traders' world, is to take place at the Café Royal, 68, Regent Street, W., on Monday, the 26th, at 7.45 p.m., and already about 70 of Capt. Ross Grant's friends and veterinary colleagues have assented to be present to wish him "God-speed" and a safe journey home. His place is being taken by Capt. Heywood, B.V.Sc., whom we all hope will be seen at our Veterinary meetings, and to whom we can assure the same cordial welcome which has always been extended to his Australian colleague.

Reviews

Black's Veterinary Dictionary. Edited by W. C. MILLER, M.R.C.V.S. Pp. 1,080. London: A. & C. Black & Co. Price 21s. net.

WE welcome the advent of this dictionary as a valuable addition to veterinary literature, firstly because it supplies beneath one cover a very large amount of up-to-date and reliable information, and secondly, because it is handy and concise. This is the third of a series of Black's Dictionaries, and it is distinguished by that same excellence which characterises its predecessors. Whilst the subjects treated are simply worded, their descriptions are very lucid and can be readily grasped by those who have little or no scientific knowledge. The book, in fact, is not primarily intended for the veterinary surgeon, but is designed to afford the owner of an animal an indication of how first-aid may be rendered whilst skilled aid is being summoned. It, however, goes much deeper than that, for it gives a clear insight into physiology and anatomy. Many of the articles have been written by a number of highly qualified and experienced contributors.

In describing the work as unusually complete, it occurs to us, however, that more recognition might have been given to the dog and cat throughout the text. For instance, whilst the various breeds of horses, cattle, sheep, pigs and poultry are fairly fully enumerated, no mention is made of those of the dog and cat. Some of the essentially feline diseases, too, have totally escaped observation. Examples of these are, among others, specific feline enteritis, and feline distemper.

Canine hysteria—the so-called new or mysterious disease of dogs of both sexes—is not mentioned, nor are the symptoms and treatment of coccidiosis in the dog and cat. The comparatively new therapy by glandular extracts is fully dealt with, but we were surprised to note the absence of any reference to therapy by ultra violet rays.

No work on general veterinary science can be regarded as really complete without a description of the principles of actino-therapy, even if the allusion went no further than that. Much work has already been done

by the veterinary profession in the testing out of treatment by the various light rays, and we presume that any subsequent edition will include a special article upon this subject.

Under the heading of "Oxygen" we failed to find any reference to the administration of oxygen subcutaneously. Oxygen-therapy is being increasingly practised by the veterinarian in the allaying of respiratory diseases, besides some other conditions, and many readers will surely seek for advice upon the matter.

The publishers have arranged the text in a pleasing style; the print is clear and the binding strong and serviceable. We recommend members of the veterinary profession to obtain a copy of this book without fail, as they will find it of inestimable value.

Notices

Royal Veterinary College Rebuilding Fund.

Urgent Appeal on Behalf of the Endowment and Establishment of a Chair and Special Department of Canine Medicine and Surgery.

As part of the total need by the Royal Veterinary College of £250,000 for Rebuilding, Equipment and Endowment, the Chairman of Spratt's Patent Limited organises an Urgent Appeal for a minimum sum of £20,000, to be controlled by the Governors of the College, to provide for the Endowment and Establishment of a Professorship, and the Buildings for a Special Department in the Royal Veterinary College for the Advancement of Canine Medicine and Surgery.

24/5, Fenchurch Street,
London, E.C.3.

FOR over a century and a quarter the Royal Veterinary College has carried on a magnificent work on behalf of our dumb animals, and when one contrasts the ignorance and charlatanry of those days with the sound, systematic, and progressive veterinary science and practice of to-day, the real progress accomplished as the result of present-day veterinary teaching can be well gauged. That throughout its entire history the Royal Veterinary College has been handicapped by insufficient funds makes the achievement the greater. Always there has been so much to do: so little to do it with.

From its inception the College has had to depend mainly on students' fees, donations, and subscriptions. A small annual grant, commenced by the Government in 1795 in recognition of the national importance of its work, ceased in 1815 with the financial stringency which followed the Napoleonic wars, and from then until 1906 the College was left to carry on its beneficial work unaided and unencouraged by any form of State assistance.

On the other hand, with the progress of Veterinary Science, continual extensions had to be made of the subjects comprised in the curriculum;

XUM

and, from 18 months at the outset the period of study was increased by stages to four years (for the University Degree it is now five), each development imposing a heavier strain on the resources of the College through the additional teaching staff and accommodation rendered necessary. Between 1890 and 1894, in an effort to meet the then requirements, the Governors expended nearly the whole of the accumulated funds of the College (over £15,000) in further building and equipment.

To-day through lapse of time, the present buildings have become far too small to meet the demands upon them, and some are definitely incapable of repair. With the continually increasing importance to the nation of Veterinary Science the Governors are faced with the urgent necessity of rebuilding the College premises, and effecting endowments which will permit of the unhindered progress of its great work through future years. For this it is calculated that a minimum sum of £250,000 will be required.

It is obvious that if knowledge of animal disease is to be increased and properly applied, investigation and education must advance hand in hand, and in order to obtain the utmost benefit veterinary education must be brought to the highest possible efficiency.

Why Dog Lovers should Support the Appeal.

It is on account of our regard for our canine friends that we should support this appeal for funds for the study of their ailments and diseases. In over three million homes dogs are loved and loving members of the family, and their health is a matter of deep concern to all. Their value is by no means merely sentimental only, for on thousands of farms their services are a large and direct contribution to successful management. In increasing numbers dogs are being employed as custodians of public and private property, and as police assistants in the detection of criminals. Further, since Great Britain has for many years been the world's market for the finest pedigree dogs, these now form a considerable export commodity and give rise to livelihoods for thousands of people, besides being responsible for a very considerable contribution to the National Exchequer. Canine health is a national asset; canine disease a national misfortune.

For many years the treatment of dogs has been demanding a greater share of the attention of the private veterinary practitioner as well as of the Royal Veterinary College, and many of the minor, and some of the major canine ailments are now known to be preventable: this being due to the discoveries made by Veterinary Science. There are, however, others which, up to the present, have defied every effort to ascertain their origin and curative treatment. Just as strange new diseases make their appearance amongst human beings to the perplexity of the medical fraternity, so at times, is the list of canine ailments added to, and demand made for definitely applied veterinary inquiry before causes can be discovered and systems of treatment perfected.

At the present time veterinary practitioners are puzzled by a most distressing malady amongst dogs which first appeared in this country about three years ago, and has since continued to occur with increasing frequency and over a wide area. Known as "Canine Hysteria" or "Fright Disease" it offers many baffling problems. Apparently normal the moment before, the dog will rush off frantically—in the words of

many owners " as if it had seen a ghost,"—and where obstructions are in front these may not be observed, and serious injury is often occasioned. In other instances the dog will start howling or barking hysterically without apparent reason ; but no two cases are entirely alike, and the actual cause has yet to be discovered.

As leaders in English veterinary thought and practice the Royal Veterinary College promptly imposed upon itself the task of studying this disorder, and the Principal of the College, Professor F. T. G. Hobday, C.M.G., F.R.C.V.S., F.R.S.E., is personally directing the inquiry. The work that has been done both by the College and independent investigators has simply emphasised the urgent need for a still greater concentration, extension, and co-ordination of effort—and that without delay.

The College has no funds to permit of the extension of this phase of its work, or to undertake work in connection with other obscure canine ailments, such as Distemper, Chorea (St. Vitus' Dance), Stuttgart Disease, Follicular Mange, Rheumatism, Interdigital Abscesses, Corneal Ulcers, etc.

This special need has arisen when the Governors are engaged with rebuilding problems, and in order to assist them my Company has placed its resources and organisation at the service of the College with the view to raising a fund sufficient to endow in perpetuity a Professorship of Canine Medicine and Surgery, and to erect new kennels and other necessary buildings for a Special Canine Department. For this purpose a minimum capital sum of £20,000 is required.

I earnestly appeal to all dog lovers to help this great and humane object and to subscribe as largely as possible. The need is urgent—delay accentuates it.

W. LETHBRIDGE,
Chairman, SPRATT'S PATENT LTD.

Cheques should be made payable to " The R.V.C. Canine Diseases Appeal," and addressed to The Chairman, Spratt's Patent Limited, 24/5, Fenchurch Street, London, E.C.3.

Some Notes on Dimol.

By INVESTIGATOR.

DIMOL is a benzene derivative possessing the very complex chemical formula $C_6H_2(CH_3)_2(OCH_3)OH$.

Chemically it is known as dimethylomethoxyphenol in combination with the tri and tetramethylophenols.

Its coefficient as computed by the Ridial Walker method is 35·0 ; the organism used is the *B. typhosus*, against which the comparative Phenol coefficient is 1·0.

It will not be denied that intestinal sepsis plays a very large part in veterinary practice in the diseases of the various breeds of animals,

and that a very large field of usefulness lies open to any agent which will control bacterial infections involving the alimentary canal.

In Dimol we have this agent and the dose is so computed that the *B. Coli* normally present, owing to their higher resistance are not affected, so that interference with their normal and natural action does not take place.

Since it has been shown that Dimol is not absorbed, nor split up, in its passage through the alimentary tract, but is voided in an unchanged condition in the fæcal matter, it follows that danger of toxicity is eliminated. Moreover, the urine shows no traces of phenol even after a prolonged course.

Dimol is suitable for administration not only to the animals of the farm, but also to the smaller animals and to poultry and birds.

It has been used with success in all types of diarrhœa, in acute bacterial infections arising out of various causes, in White Scour of calves, in intestinal stasis, in canine and feline enteritis, in lymphangitis, rheumatism and the bacterial diseases of poultry.

Not only has its utility been proved in similar conditions, but Dimol has been found to give good service in uterine sepsis. It may be used in the form of pessaries or as a douche, and is suitable for routine use in metritis and vaginitis arising in all animals from a multiplicity of causes.

It may be used as an electuary in pharyngitis and the catarrhs of the naso-pharyngeal tracts.

It has replaced many of the agents formerly used in dusting powders and ointments for application in wounds, abrasions, and the common types of skin lesions encountered in every-day veterinary practice.

Corrigenda.

In the review of Capt. Leese's book, "The One-Humped Camel," the price is stated to be 21s. This should read 16s. plus postage.

In the article on the "Appeal for Funds for the Rebuilding and Endowment of the Royal Veterinary College, London," the descriptions under Fig. 3 and Fig. 7 should be transposed. Fig. 3 represents "The Anatomical Institute of the Veterinary Faculty of the University of Utrecht," and Fig. 7 should read "The Exterior of the Buildings of the Veterinary Faculty of the University of Leipzig, Germany."

Lemberg, stated to have belonged to Russia, is the old Polish town of Livow, which was really allotted to Austria—not Russia, as stated in our text. For this latter correction we are indebted to our distinguished Polish colleague, Vet.-Lieut.-Col. Marcin Marezewski, who writes to us from Warsaw.

XUM